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The EXTENSION ENTOMOLOGIST

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BUREAU OF ENTOMOLOGY

"During the past 25 years, the Agricultural Extension Service has achieved one of the greatest educational accomplishments ever achieved at any time or at any place in the history of mankind." -- M. L. Wilson, Under Secretary of Agriculture.

"Extension work requires a new kind of teacher, one who helps rural people to analyze conditions, to relate situations as they now are on the farm and in the home to what they may be; and brings about technical economic and social changes for the better. It calls for teachers who guide and help to develop people rather than tell them, teachers who let the people themselves make the surveys, find out the facts, act on the committee, reach the decision, present the report, develop the program, write the important letter, make the speech, or preside at the meeting - teachers who submerge themselves in order that the ones they teach may get the experience and grow into efficient, accomplishing men and women; and in an unusually large degree that is the kind of teachers that are developing in extension." -- Dr. C. B. Smith.

According to Under Secretary Wilson, we have gone a long way in the past 25 years, but let us pause to see if we measure up to the kind of teacher Dr. Smith deems necessary to carry out the present extension job.

M. P. Jones

M. P. Jones
Extension Entomologist

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE AND
EXTENSION SERVICE, COOPERATING

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ANNOUNCEMENT OF MEETINGS

February 7, 8, and 9, 1940. - Meeting of the Cotton States Branch, American Association of Economic Entomologists. Bankhead Hotel, Birmingham, Ala.

February 14, 15, and 16, 1940. - Meeting of the Texas Entomological Society. Reese-Wil-Mond Hotel, Harlingen, Tex.

March 21-22, 1940. - North Central States Entomologists' Conference. Union Building, Purdue University, La Fayette, Ind.

PERSONNEL CHANGES

Iowa State College of Agriculture. - Effective November 15, 1939, Harold Gunderson, formerly assistant extension entomologist in Iowa, was appointed full-time extension entomologist to fill the vacancy created by the resignation of Dr. H. D. Tate, who has taken up his duties as associate professor of entomology at the College of Agriculture, Lincoln, Nebr.

REPORT OF THE MEETING OF SECTION OF EXTENSION

The eleventh annual meeting of the Section on Extension Entomology met on Thursday afternoon, December 28, in Room 216 of the Dreshler-Wallick Hotel, Columbus, Ohio, with chairman George D. Jones, of Missouri, presiding. The program was built around the theme, the effects of present-day agricultural practices on insect problems. The two main papers were presented by J. L. Boatman, Washington, D. C. on Subject Matter Programs in Relation to Present-Day Agriculture; and in the absence of Dr. P. N. Annand, Washington, D. C., his paper on Recent Changes in Agriculture and Their Effects on Insect Problems was presented by Mr. S. A. Rohwer of Washington, D. C. Nine other speakers discussed topics directly related to the two main papers, which brought out a lively discussion from the floor. Prof. G. A. Dean, of Kansas, summarized the present-day agricultural practices and their relation to insect problems in that State in a most interesting way. He brought out the fact that entomology plays a very important role in practically all agricultural practices and should not be overlooked.

The officers elected for the ensuing year are: Chairman, C. B. Dibble, of Michigan, and Secretary, G. E. Lehker, of Indiana.

--J. O. Pepper, Secretary.

SPECIAL ARTICLES

THE AGRICULTURAL EXTENSION SERVICE/1

M. L. Wilson

Under Secretary of Agriculture

During the past 25 years, the Agricultural Extension Service has achieved one of the greatest educational accomplishments that has ever been achieved at any time or at any place in the history of mankind.

This is a large statement. But I make it advisedly.

The accomplishment which Extension has brought about in one generation is a change in the attitude of farm people towards science in agriculture. The great mass of the farm population of this country now accept it. Twenty-five years ago, when extension work started, there was a broad fringe of people who accepted scientific agriculture. But in their attitude the great mass of farmers reflected one of two views - skepticism or smugness. They were either skeptical or they showed a kind of entrenched egotism that made them feel it was a little beneath the dignity of a "practical" farmer to have anything to do with "theoretical farm experts." Much of the scientific agricultural thought simply did not register in the minds nor in the culture of the great mass of farmers. Some said "it was just another way of spending the taxpayers' money." If, 25 years ago, there had been a Gallup poll of farm opinion on a question that might have been stated -- Do you think there is anything of practical value to you and your farm in scientific agriculture?-- likely as not the great mass of working farmers in the United States would either have voted "no" or would have been neutral. I'm convinced that if such a Gallup poll were made today, 90 percent of the farm people would answer "yes." In other words, in this generation, in this short space of a quarter of a century, there has been this change of attitude from skepticism and self-satisfaction to acceptance and confidence in scientific agriculture. I know of no other accomplishment in the field of adult education anywhere that even begins to approach this change. It has great potentialities for our future. I don't believe that the Extension people themselves fully realize this, because its development has been so imperceptible. It is something which has grown out of the hour by hour, day by day, and week by week conscientious, energetic work of the county and State agricultural extension workers. It has been so gradual that we can sense it only by viewing it in perspective. Behind the change, of course, is the 75 years of research and teaching in the land-grant colleges and the work of the United States Department of Agriculture.

1 Excerpt from paper entitled "The place of the Extension Service in the New Department of Agriculture," presented before the Extension Work Subsection, Association of Land-Grant Colleges and Universities, Washington, D. C., November 16, 1939.

ORGANIZING TERMITE-CONTROL MEETINGS

G. E. Lehker
La Fayette, Indiana

"The material in the following article was used in organizing the termite-control program. Copies of this material were sent to all county agents who requested termite-control meetings. By giving the agents this assistance, the meetings will be better organized and given better publicity than otherwise. County agents of course are busy, and on some occasions do not find time for as much consideration as they would like to give to certain projects. This is especially true of termite-control work, inasmuch as many of the agents are not familiar with the procedure of organizing and conducting meetings of this kind."

Termite-Control Demonstrations

Purpose.

A great many people are keenly interested in termites and their control. Because of an apparent lack of understanding of the habits of these insects, many persons have needlessly wasted time and materials in control, in ineffective control measures.

The purpose of termite-control meetings is to supply this information and to offer instruction in what can be done to control the insects with home facilities and unpatented materials, and how best to judge the work of commercial termite-control operators. The termite question is one of great interest; demonstration meetings on this subject also offer builder, contractors, and real-estate men an excellent opportunity to become more familiar with extension activities.

Procedure.

The ideal place to hold a termite meeting is at a residence known to be infested with the insects. This gives the public a chance actually to see the termites and the damage they do. Sometimes such a place can be located through the cooperation of real-estate dealers or building and loan associations, which are willing to permit a meeting to be held at one of their properties. If such a place cannot be located in this manner, or otherwise, a lecture meeting in a suitable hall will draw a good attendance. Some county agents have arranged for both, holding the demonstration in the afternoon and the lecture meeting in the evening. If the agent so desires, attendance can be increased by conducting two of the outside meetings in the same afternoon, one in the country and the other in the city.

The morning can well be spent inspecting the homes of those who have specifically asked for assistance.

Four suggested news stories are offered in this outline, the first to be run at least a week in advance of the meeting. Contractors, builders,

carpenters, real-estate men, and vocational teachers can be personally invited by means of a circular letter or card, or by means of the telephone. A suggested circular letter is also contained in this outline. Radio announcements are exceedingly valuable where facilities are available.

Activity for the day.

Activity for the day will consist of holding the meeting or meetings scheduled, and also of making inspections or visits to infested homes in the city or country, where owners have asked for assistance. Newspaper publicity will usually result in calls being made for inspections. Such visits will aid the county agent in becoming familiar with the situation in his county, and also provide material for use at the meetings.

Suggested news stories.

No. 1

Termite Specialist To Visit County

Termite-proofing buildings, and control of the insects in infested homes, will be the object of a visit here by G. E. Lehker, Purdue extension entomologist, who will come to County _____, in the interest of the fight against the so-called "white ants." Mr. Lehker is being brought here through the efforts of County Agent _____, who has arranged a public meeting to be held at the residence at _____, which is known to be infested with termites. The meeting will give _____ and _____ County residents an excellent opportunity to obtain first-hand information about this much-talked-of pest. The time has been set for 2:30 o'clock.

No. 2

Termite Meeting To Be Held Here

Property owners, builders, contractors, and others interested in learning about termites and how to control them are urged to attend a demonstration meeting to be held _____ at _____ Street. The time is _____ o'clock. The meeting will be under the direction of County Agent _____, who has arranged for G. E. Lehker, extension entomologist of Purdue University, to be here and discuss these insects and their control.

The meeting is for the purpose of assisting property owners and the general public to learn how to recognize termites and their damage to buildings, and means of prevention and control. _____ announced that the meeting offers a rare opportunity for those whose property is being damaged by these insects, or suspect that their buildings are infested, to obtain expert advice on termite eradication.

Mr. Lehker will also be here during the morning and will inspect several homes in _____ known to be infested.

No. 3

Much Interest Here in Termite Meeting

Much interest is being manifested in the termite-control meeting set for _____ at _____ p.m. at _____ Street. The meeting will be under the direction of County Agent _____, assisted by G. E. Lehker, extension entomologist of Purdue University. Termites, which are sometimes called "white ants," because the workers are white in color and have an ant-like appearance, are becoming prevalent in _____ homes and are considered 1 of the 10 most destructive insects in Indiana, according to Mr. _____.

The natural habitat of termites is in wooded areas, where they act as scavengers and eat and otherwise dispose of dead roots and stumps. With the removal of their normal food materials, the erection of buildings on ground where colonies already exist, and with increasing construction, termites have become increasingly important pests of buildings.

They attack and destroy supporting timbers, and in extreme cases destroy the entire building. There are a number of homes in _____ where termites have made necessary the complete replacement of all sills and plates. The Tuesday afternoon meeting will be open to the public.

No. 4

Termite Control To Be Demonstrated

The termite demonstration to be conducted here next Tuesday by G. E. Lehker of the Purdue University Entomology Department, will be held at _____ Street. The time has been set for _____.

The property at _____ Street is one of a number in _____ known to be infested with termites. Those who attend the control demonstration will be able to see the insects and their damage, Mr. _____ says. Mr. Lehker will discuss control of the insects in buildings already infested, and discuss also termite-proofing of structures to prevent attack.

The insects work inside timbers, and often are undetected until a floor caves in, leaving only the shell of the woodwork remaining. The colonies live in the soil, moisture being necessary to their life. They enter houses through wood in direct contact with the soil, or else build protective tunnels to reach their destination.

The meeting will be open to the public. A large attendance is expected, the county agent having received many calls relative to infestations from all sections of the city and county.

Suggested Letter

Mr. John Doe
Superior Construction Co.,
Muncie, Ind.

Dear Mr. Doe:

Being connected with the building industry, you are no doubt interested in termites, termite control, and the subject of termite-proofing buildings.

G. E. Lehker, extension entomologist of Purdue University, will be here _____, to discuss these problems of great interest. We are holding a public meeting at _____ Street at _____ o'clock in the afternoon, and personally invite you to attend.

Yours very truly,

County Agricultural Agent.

Suggested follow-up story.

"Termites and how to control them" was the subject of an address yesterday by G. E. Lehker, Purdue extension entomologist, who came to _____ County, in the interest of the fight against termite infestation of buildings. During his visit here he gave a demonstration and lecture at _____ Street, where a home is badly infested. County Agent _____ arranged the meeting.

Mr. Lehker said that buildings and other wooden structures in Indiana are damaged to the extent of \$2,000,000 annually by these destructive pests. Usually home owners fail to recognize the signs of infestation, or else the damage is attributed to dry rot or similar causes. The presence of winged termites, termite-damaged wood, or mud shelter tubes on timbers or foundation walls are certain signs of infestation, he said. Shelter tubes or so-called "tunnels" are constructed by the insects in order to reach the wood from their nests in the soil.

Speaking of the prevention and control of termites, Lehker said: "Always remember that an infested building is merely a pasture field in which the insects are feeding and that their colonies are located in the ground where moisture is available. The whole principle of prevention and control, therefore, is to break the ground connection and insulate the building to prevent further attack." This may be done in any of a number of ways, he said, depending on the type of structure and the manner in which the insects are working. Among the ways mentioned were: (1) Structural repairs which will eliminate the points of entry. (2) Soil treatments to prevent the termite from gaining access to the wood. (3) Pressure treatment of supporting timbers. (4) The use of metal shields on top of foundation walls to break the ground contact.

Several methods of control were discounted by Lehker as being worthless or at least of little value. Among these were: Destruction of the swarmers, fumigation of infested buildings, merely painting or spraying any substance on infested timbers, and the use of simple poisons that are supposed to be carried to the colonies by the worker insects.

THE TEXAS 4-H CLUB BOYS' INSECT-JUDGING CONTEST

R. R. Reppert and Cameron Siddall, extension entomologists

The third 4-H Club boys' insect-judging contest, conducted annually at the short course at College Station, has recently been held with six teams of three boys each, competing.

The object of this contest is to inspire and develop interest in insect life among club boys, and through them and their collections to arouse interest in insects and their control among farmers. It was further conceived that such a project would be of great aid to county agents in properly handling emergencies of insect outbreak.

With an unusually heavy grasshopper infestation demanding the attention of the entomologist during the three seasons this contest has been offered, our close personal attention could not be devoted to it as had been planned. Nevertheless, interest in the contest has slowly increased from year to year. In 1937 there were three entries of three boys each; in 1938, five entries; in 1939, six entries. The appointment of Cameron Siddall as assistant extension entomologist, and his keen and practical interest in this field, will certainly press the undertaking to greater success.

Some changes based on experience have been made in the contest since it was started. In the beginning no limit was placed on the number of species to be presented, and nothing was said about the type of insect to be displayed. Collections as a result tended toward the showy aspect. Also, in spite of varied climate and agricultural products such as Texas has, it was inevitable that some section would have an advantage in the number of species readily obtainable.

These defects are being corrected for next season's contest by limiting each collection to 45 species taken from a list of 109 insects of economic importance to Texas agriculture, so selected that the goal of 45 is easily attained in all parts of the State.

In the past, certain enthusiastic agents have, themselves, provided funds for building display boxes of excellent appearance, and for purchasing mounting pins. This has tended to discourage other counties that did not have this advantage. To correct this and to make the contest more nearly within the reach of all, the rule has been laid down that only cigar boxes, covered with paper if desired, shall be used, with no penalty if nursery pins are used for mounting. Though these are the rules of the contest, it is pointed out that these insects moved to more elaborate display boxes, which

also include more showy insects of lesser importance, may be used with good effect for local purposes within the county. Besides the collection to be exhibited at the short course, contestants are required to stand examination regarding their knowledge of certain insect species and their control, this examination to be oral.

For the examination, all counties are provided early in the year, so that the boys may study them, a list of 40 economic insects for which Riker mounts will be available at the short course. Each county is free to select any 10 of these for intensive study by its boys, and on which they will be ready to stand examination. Each county will submit, at least 1 week before the contest, its own list; then, from this list the examination judges will, themselves, select three species on which the entrants of that particular county are to stand their oral examination.

EXCERPTS FROM ANNUAL REPORTS

INDIANA

4-H Club Insect Study

Insect control is of importance in any 4-H Club project. Boys and girls enrolled in clubs involving the production of crops or livestock are directly concerned with the pests affecting these plants or animals. Girls in canning clubs should have some knowledge of how to produce quality fruits and vegetables free of insects, and in the case of sewing clubs, clothes moths and the like are of direct interest.

4-H Club insect study offers an excellent opportunity for young people to become familiar with the fundamentals of insect life and insect control. Such knowledge will be of value in future years, regardless of what vocation these young people may choose for their life work. There is also a strong tendency for young people to underestimate the importance of insect control and to accept the crude methods often practiced by their parents. 4-H Club insect study tends to arouse appreciation of insect control, and brings to 4-H Club members modern and effective methods of coping with the many serious pests prevalent today.

Another reason for including this project phase in the year's work was to give young people living in small towns and villages an opportunity to become associated with 4-H Club work. In many cases these boys and girls have neither the land or livestock necessary for enrollment in some of the established clubs. Entomology clubs, therefore, serve this purpose ideally.

Last year there were no organized 4-H insect-study clubs in existence; at the present time 10 such clubs have been organized with an enrollment of over 400.

--Annual Report, Indiana Extension
Entomologist, 1938.

PENNSYLVANIA

Striped Cucumber Beetle Control

Cucumber beetles are annual depredators of cucumber plants. This year was no exception. The situation enabled us to demonstrate in cooperation with plant pathologists the availability of a rather new insecticide-fungicide combination as a protection from beetle damage to cucumbers. Last year we arranged some initial work which was mentioned in the report for 1938. This year 27 demonstrations were conducted in 14 counties. The results of one of them, in Crawford County, indicates the efficiency of the treatment on the basis of the yields in the different plots, table 1.

Table 1. Comparison of dust mixtures for effectiveness in cucumber-beetle control.

Materials	Treatments	Yield
	Number	Pounds
Copper-oxychloride flour and calcium arsenate	4	1,320
Calcium arsenate and gypsum	4	936

To show that this was not a local condition, another demonstration was conducted in Wyoming County in eastern Pennsylvania. In this case a different commercial brand of copper oxychloride was employed with the poison. The copper-arsenical combination again resulted in a sizable increase in yield. The yields given in table 2 have been arranged on the basis of pounds of cucumbers per acre.

Table 2. Comparison of dust mixtures for effectiveness in cucumber-beetle control

Materials	Treatments Number	Comparison per acre	
		Yield Pounds	Gain Pounds
Copper-oxychloride flour and calcium arsenate ..	4	9,680	3,945
Calcium arsenate and gypsum	4	5,735	

--Annual Report, Pennsylvania
Extension Entomologist, 1939.

NEW YORK

Horticultural-society meetings.

Reports on insect development during the 1937 season were presented at the meetings of the Horticultural Society at Rochester and Kingston. An insect and disease identification contest for young people was conducted at both these meetings in cooperation with the department of plant pathology. These contests and the banquet at which the prizes were awarded have become a feature on the program of the Horticultural Society.

--Annual Report on Entomology,
New York, 1937.

OHIO

4-H Club Activities

The extension entomologist served as discussion leader during 4 days of the Annual Club Congress held on the university campus in September. He also addressed a 4-H meeting of leaders and advisers in Muskingum County on June 9. This meeting was attended by about 350 Muskingum County young folks, and the address was broadcast over the Zanesville radio station.

--Annual Report, Ohio Extension
Entomologist, 1938.

TIMELY TOPICS

ADDING OIL EMULSION TO DERRIS SPRAYS OR DUSTS INCREASES
TOXICITY TO PLANT BUGS

Laboratory tests were performed during the last 10 months at the Columbus, Ohio, laboratory of the Bureau of Entomology and Plant Quarantine by R. A. Fulton and N. F. Howard in an effort to determine whether the toxicity of derris-root powder in water to plant bugs could be increased by the use of oil emulsions. They showed that the toxicity of derris, nicotine, nicotine sulphate, and anabasine sulphate to the squash bug (*Anasa tristis* Deg.) was markedly increased by the use of certain oils, especially peanut oil. The toxicity of derris was greatly increased when acetone was added to the powder 24 hours before use and was still further increased when peanut oil was used. Peanut oil appeared to be the most effective of the oils tested, which, in addition to the latter, included tung oil, teaseed oil, corn oil, olive oil, and petrolatum. More recently, peanut-oil mixtures and pine-oil mixtures have been tested against the harlequin bug, *Murgantia histrionica* (Hahn), with similar results. Derris-talc dust mixtures in which peanut oil has been impregnated have also been experimented with in the laboratory, and it appears that the addition of peanut oil or pine oil to a derris-talc dust mixture greatly increases its toxicity. In fact, a

derris-talc dust mixture without an oil and containing 0.5 percent of rotenone is very nearly innocuous against the harlequin bug. The status of a wetting agent in the derris-talc-oil dust mixture has not been determined definitely, but it is believed, on the basis of results obtained in preliminary experiments, that a wetting agent is unnecessary in this mixture and may be detrimental.

CONTROL OF APHIDS ON LETTUCE BY HYDROCYANIC- ACID GAS FUMIGATION

C. A. Weigel and G. V. Johnson, of the Beltsville, Md., laboratory, Bureau of Entomology and Plant Quarantine, in conducting a series of six fumigations with calcium cyanide for the control of aphids on greenhouse-grown lettuce, report that dosages varying from 1/8 to 1/4 ounce per 1,000 cubic feet of space, with exposures made at weekly intervals, were tolerated by the lettuce under conditions simulating commercial practice. A slight bleaching occurred on the edges of the leaves of some of the plants. This condition was shown not to be caused by the fumigation, but was apparently intensified by it. Mortality records of aphids on infested plants growing in pots placed in the greenhouse during varying exposures indicated that a dosage rate of 3/16 ounce was necessary to give a satisfactory kill of the potato aphid, and a 1/4-ounce dosage was needed to control the green peach aphid. These results agree with those obtained during the course of tests performed in 1937 and demonstrate that this method of control may have a practical application in large-scale commercial fumigations.

EFFICIENCY OF ROTENONE-DUST MIXTURE AGAINST TURNIP APHID NOT IMPROVED BY CONDITIONING AGENTS

An extensive series of field tests performed by P. K. Harrison, of the Baton Rouge, La., laboratory, Bureau of Entomology and Plant Quarantine, demonstrated that the efficiency of the standard rotenone-dust mixture against Rhopalosiphum pseudobrassicae (Davis) was not improved by the addition of various conditioning agents. These experiments were performed on broadleaved mustard and white-tipped radishes. The experimental series involving mustard received 3 applications of the various insecticidal mixtures at 2-week intervals beginning on March 8, whereas in the radish experiments 2 applications were made on March 24 and April 7, respectively. Twenty different dust mixtures were used in each experiment, involving the use of dilutions of 1.0 and 0.5 percent of rotenone, respectively. Equal parts of tobacco dust and dusting sulfur, or talc, were used as diluents. Various conditioning agents were used in 16 of these dust mixtures, such agents consisting of 1 or 2 percent of peanut oil, 4 percent of soybean flour, and 1 percent of the following: Peanut butter, cottonseed oil, pine oil, oleic acid, sulfonated castor oil, sodium oleyl sulfate, or an alkylated naphthalenesulfonate. Critical analysis of the data resulting from these experiments with respect to yield of the mustard and radishes, demonstrated that there were no significant differences in yield between these treatments. This indicates that the present standard recommendation for turnip aphid

control, consisting of a rotenone-dust mixture containing 1 percent of rotenone with equal parts of tobacco dust and sulfur is not appreciably improved by the addition of any of the more common conditioning agents used in combating aphids.

CABBAGE-MAGGOT CONTROL

According to R. W. Leiby, New York State College of Agriculture, injury by the cabbage maggot may be prevented by the calomel gum-arabic seed treatment, or be controlled by applying a calomel suspension or corrosive sublimate solution to plants in the seedbed or to plants after they are set in the field.

Calomel treatment of cabbage seed.--Seedling cabbage plants can be protected from maggot feeding by dissolving 1 ounce of finely divided corrosive sublimate in 10 gallons of water and applying this solution directly to the soil around the young plants with a watering pot from which the perforated nozzle has been removed. One gallon will treat 40 row feet. Two or three applications used at intervals of about one a week are usually necessary for good control. The corrosive-sublimate solution kills the eggs of the fly or the young maggots when it comes in contact with them. When this solution is used on cauliflower seedbeds, it should be diluted at the rate of 1 ounce to 15 gallons of water for the first application, and at the rate of 1 ounce to 10 or 12 gallons of water for subsequent applications. Young cauliflower plants are liable to be injured by the 1 to 10 solution.

Control on early cabbage and cauliflower in the field.--After plants are set in the field, they may become seriously injured or killed by the feeding of maggots, especially if the plants are being started in their growth while the early broods of flies are laying eggs. These minute white eggs are usually laid in soil cracks at or near the stems of the plants.

The 1 to 10 corrosive sublimate solution may be applied in the same manner as that described for seedbeds. A wheelbarrow type of applicator is often used on large acreages. A pail and dipper method of application is suitable for small plantings. Two or three applications are usually necessary at weekly intervals, the first being made four days after transplanting is completed.

Another field control method is to puff with a hand duster, the base of each plant with a mixture of 1 pound of calomel and 24 pounds of hydrated lime or gypsum. About 75 pounds of the dust are necessary for each acre. Applications should be repeated as suggested for the corrosive-sublimate solution treatments.

Dusting plants at transplanting to prevent maggot injury is a common practice in Nassau County. One pound of cornstarch is mixed thoroughly with one pound of very finely ground calomel. After the cabbage plants are pulled, they are spread out in a row on a table. The root systems are covered with a strip of paper to prevent the poison mixture from getting on the roots, as

the dust is injurious to them. The calomel-cornstarch mixture is then shaken (with a salt shaker) onto the moistened stems of the plants. After dusting, the plants are set in the field.

When cauliflower plants are dusted in this way at transplanting, a dusting mixture of 1 pound of finely ground calomel and 10 pounds of hydrated lime should be used. Avoid getting the dust on the roots.

Cabbage-maggot control is a tried, proved, and accepted practice for the growing of cabbage, cauliflower, etc. Nearly $1\frac{1}{2}$ tons of calomel were used in Nassau County alone in 1937 for maggot prevention and control. Satisfactory results are always obtained when one or more of the suggested control measures are followed with care and thoroughness.

EFFECTIVENESS OF POISONED-BRAN BAIT ON GREEN JUNE-BEETLE LARVAE IN TOBACCO PLANT BEDS

Normal Allen, of the Florence, S. C., laboratory Bureau Entomology and Plant Quarantine, reports that, in tests conducted in February, a poisoned-bran bait consisting of 1 pound of paris green to 25 pounds of wheat bran, applied broadcast to a tobacco plant bed infested by larvae of Cotinus nitida (L.), resulted in an apparent reduction of approximately 88 percent of new burrows of this pest after the expiration of 72 hours. The plant bed under observation, covering an area of slightly less than 800 square yards, was found to have 717 burrows prior to the application of the poisoned bait and only 87 after the bait had been applied. Some of the tobacco growers controlled the green June-beetle larvae satisfactorily by applying this bait around the burrows only. Indications were that injury by this pest was confined to old plant-bed sites, and could have been avoided by the selection of new-bed sites. The number of dead grubs could not be determined because such a procedure would have necessitated the digging up of the plant bed.

METALDEHYDE EFFECTIVE AS SNAIL AND SLUG POISON

Rodney Cecil, of the Ventura, Calif., Bureau of Entomology and Plant Quarantine laboratory, reports that an experiment with metaldehyde against snails and slugs proved very effective against these pests under the conditions existing in the Ventura area. The material, consisting of a proprietary mixture composed of 2 percent metaldehyde and 98 percent inert material, was spread in a 2-inch strip on a sidewalk 25 feet in length, flanked by two strips of lawn, each 25 feet square. During the period April 18 to 28, inclusive, 775 snails and slugs were attracted and killed by this poisoned bait.

METHYL BROMIDE SUCCESSFUL IN MILL FUMIGATION

R. T. Cotton, of the Manhattan, Kans., laboratory, says that methyl bromide was recently used to fumigate a small flour mill in Chicago, Ill. The

fumigant was introduced into the machinery by means of a piping system. An excellent kill was obtained of insects planted in the milling units, although the dosage of 8.8 ounces per 1,000 cubic feet of space was not sufficient to kill insects outside the machinery.

LIME, SAND, AND OTHER DUSTS INEFFECTIVE IN CONTROL OF INSECTS IN STORED GRAIN

According to Mr. G. B. Wagner and Mr. T. F. Winburn, Bureau of Entomology and Plant Quarantine, Manhattan, Kans., recent tests with a number of dusts such as finely ground sand, wood ashes, lime, sulfur, soybean flour, and borax indicate that, with the exception of the borax dust, those substances, when mixed with stored grain at the rate of 1 or 2 percent by weight, have no appreciable effect in preventing insect development unless the moisture content of the wheat is low. Borax has a decided protective action, but cannot be recommended because it is absorbed by the grain.

THRESHING OF ALFALFA DESTROYS ADULTS OF HYPERA BRUNNEIPENNIS

As a result of the recent discovery by Arizona State officials of the presence of a new weevil pest of legumes, Hypera brunneipennis (Boh.) in the Yuma Valley, Ariz., it became immediately desirable to determine what effect the threshing of alfalfa for seed would have on the survival of adult weevils contained in the hay. The result of a series of 12 threshing tests made by W. C. McDuffie at Yuma, showed that in no case did any live beetles succeed in passing through the threshing machine. Numerous fragments of weevils, placed alive in the hay before threshing, were found both in the dirt-seed and blower outlets of the thresher. It was therefore believed that there was very slight danger, if any, of seed's becoming contaminated with live beetles. The fact that the weevils have aestivated in sheltered places throughout the summer and none has been active in the field still further reduces this danger. This is an important question, because the Yuma Valley is an important alfalfa-seed producing and shipping area.

GRASSHOPPERS VERSUS COWS AS FEEDERS

Mr. Morton of the Bozeman, Mont., laboratory of the Bureau of Entomology and Plant Quarantine, conducted experiments in 1936, 1937, and 1938 to determine the quantity of grass eaten by known numbers of range grasshoppers. These experiments determined that 301,396 grasshoppers destroy enough vegetation to maintain an average-size cow on minimum feed. A cow requiring 3 acres per month for subsistence rations, would have nothing left to eat if these acres had a population of 24 adult grasshoppers a square meter.

PRELIMINARY RESULTS WITH DICHLOR-ETHYL ETHER FOR PLUM CURCULIO CONTROL

Oliver I. Snapp and J. R. Thomson, Jr., of the peach-insect laboratory, Bureau of Entomology and Plant Quarantine, at Fort Valley, Ga., have completed experiments, in cages built over peach trees, to obtain data on the effectiveness of dichlor-ethyl ether against the immature stages of the plum curculio in the soil under cage conditions. They report that, 1,000 plum curculio larvae were placed on the soil under each of these caged trees during the period April 29 to May 2. Dichlor-ethyl ether was used at the rate of 10 cc. per gallon of water on each square yard of soil against the larvae in 1 cage on May 4 and at the rate of 30 cc. per gallon of water on each square yard of soil against the pupae in another cage on May 17. Not a single curculio adult emerged in the cage where the stronger material was used, and only nine adults emerged in the cage where the weaker material was used. All peaches produced on these trees and harvested in July were free from curculio larvae.

SPRAYING APPLE TREES

"The dropping of apples before they are fully mature has long annoyed growers," says the Florists' Exchange and Horticultural Trade World (September 23). "Experimental spraying with growth-promoting substances in solution, particularly naphthalene compounds, at the United States Horticultural Station, Beltsville, Md., have shown that treated trees dropped only 1.5 percent of their fruit compared with 64 to 90 percent on untreated trees. The cause of fruit drop unduly early is abscission between fruit stalk and branch to which it is attached; a similar condition causes trees to drop their leaves in the fall. Spraying with growth-promoting chemical solutions 0.00025 percent, arrests such severance and enables the fruit to hang on until truly ready for picking."

METHYL-BROMIDE FUMIGATION BEGUN IN PENNSYLVANIA

On May 1 a nurseryman at Strafford, Pa., completed the first fumigation chamber to be used in the State. Since that date 3,145 potted plants have been fumigated and certified for shipment from the infested area. These plants, valued at \$1,500, would not have been certified under previous fumigation requirements. A further demonstration of methyl bromide fumigation was held at a large greenhouse establishment at Norwood, Pa., on May 3. The demonstration was well attended by nearby nurserymen and florists, who brought nursery, perennial, and greenhouse stock for fumigation. This stock was returned to the respective owners for observation. A similar demonstration was also staged at Bloomsburg, in central Pennsylvania, on May 23. The Pennsylvania Nurserymen's Association has requested that a demonstration be arranged for their annual summer picnic to be held at State College.

EXTRACT FROM CASTOR-BEAN PLANT NOT TOXIC TO BOLL WEEVIL AND COTTON STAINER

At Brooksville, Fla., an extract from the castor-bean plant is being developed for insecticidal purposes. It is prepared in two forms, liquid and dust. This castor-bean extract was reported as "a combination stomach and contact insecticide, and as being effective in controlling nearly all of the common citrus pests." To determine if this castor-bean extract has any value for use against cotton insects, C. S. Rude, Bureau of Entomology and Plant Quarantine, Gainesville, Fla., conducted several tests in June against the boll weevil and the cotton stainer, Dysdercus suturellus (H.S.), using the liquid extract at the rate of $\frac{1}{2}$ pint and 1 pint to 2 gallons of water. This material was found to have no toxic effect on the boll weevil or the cotton stainer and to be of no value as an insecticide for use against these insects.

EFFECTIVENESS OF DERRIS WASHES ON CATTLE GRUBS

Results of experiments conducted by R. W. Wells and H. O. Schroeder, on the control of cattle grubs, indicate that derris washes consisting of 8 and 12 ounces of derris to the gallon of water plus 4 ounces of soap, applied at the rate of $\frac{1}{3}$ quart per animal, are less toxic to Hypoderma bovis (Deg.) than to Hypoderma lineatum (De Vill.). In the former species, the third-instar larvae were more resistant to the washes than were the second instar; with the latter species the reverse is the case. Hand rubbing of the backs of the animals after the application of the insecticide is more effective in killing H. lineata larvae than brush rubbing, but in treating animals infested with H. bovis, brush rubbing is just as effective as hand rubbing.

EFFECT OF CRYOLITE ON PLANT GROWTH

A preliminary test to determine the effect of synthetic cryolite on the germination and growth of cowpeas was conducted this spring by F. F. Bondy and C. F. Rainwater, of the Bureau of Entomology and Plant Quarantine, Florence, S. C. Cryolite was added to a fairly fertile sandy soil, typical of the section, at the rates of 100, 200, 400, 800, and 1,600 pounds per acre. Six-inch pots were filled with the soil and planted to cowpeas under greenhouse conditions. The germination was not affected, and the peas in all the treatments grew at approximately the same rate. Cowpeas are very susceptible to injury from arsenic in the soil, but apparently synthetic cryolite is safe to use as an insecticide insofar as soil injury is concerned.